

CLAIMS

1. A method of manufacturing a multi-layer outer panel for a game ball, the method comprising the steps of:
 - a. three-dimensionally forming a top layer comprising a first material and having an outer surface and an inner surface, the outer surface of the top layer dimensioned to substantially correspond to a section of a surface of the ball;
 - b. three-dimensionally forming at least one backing layer comprising a second material and having an outer surface and an inner surface, the inner surface of the at least one backing layer dimensioned to substantially correspond to the section of the surface of the ball; and
 - c. connecting the inner surface of the top layer and the outer surface of the at least one backing layer, thereby forming the outer panel.
2. The method of claim 1, wherein step (b) is performed prior to step (a) and wherein, in step (a), the backing layer is used to three-dimensionally form the top layer.
3. The method of claim 2, wherein the top layer is three-dimensionally formed by at least one of deep drawing, vacuum forming, injection molding, dipping the at least one backing layer into the first material, and spraying the first material onto the at least one backing layer.
4. The method of claim 3, wherein the backing layer is used on a lower side of a stamp for deep drawing the top layer.
5. The method of claim 1, wherein the top layer is three-dimensionally formed by at least one of deep drawing, vacuum forming, injection molding, and spraying into a mold.
6. The method of claim 5, wherein step (a) is performed prior to step (b) and wherein, in step (b), the top layer is used to three-dimensionally form the backing layer.
7. The method of claim 6, wherein the top layer is at least partially used as a mold for three-dimensionally forming the backing layer.
8. The method of claim 1, wherein step (a) and step (b) are performed independently.
9. The method of claim 1, wherein the outer surface of the backing layer is dimensioned to

substantially match the inner surface of the top layer.

10. The method of claim 1, wherein the outer panel has a predetermined radius of curvature substantially matching a radius of the game ball.
11. The method of claim 1, wherein, in step (c), the top layer and the at least one backing layer are connected by at least one of a chemical bond, a physical bond, and an adhesive.
12. The method of claim 11, wherein the outer panel is substantially free of mechanical stress at an interface between the top layer and the backing layer.
13. The method of claim 1, wherein the first material comprises a thermoplastic elastomer.
14. The method of claim 13, wherein the thermoplastic elastomer is selected from the group consisting of polyurethane, polyester, polyamide, polyolefin, polyethylene, polyvinyl chloride, and polybutadiene.
15. The method of claim 13, wherein the first material is substantially transparent.
16. The method of claim 15 further comprising, prior to step (a), providing at least one image on at least one of the inner surface and the outer surface of the first material and cutting the first material into a two-dimensional section.
17. The method of claim 16, wherein the step of providing an image on at least one of the inner surface and the outer surface of the first material comprises depositing an imaging material onto the at least one surface of the first material.
18. The method of claim 1, wherein the second material comprises a foam material.
19. The method of claim 18, wherein the foam material is selected from the group consisting of polyurethane, ethylene vinyl acetate, and latex.
20. The method of claim 18, wherein the foam material is prevulcanized prior to the three-dimensional forming of the backing layer.
21. The method of claim 1, wherein the second material comprises a mesh material.

22. The method of claim 1, further comprising attaching a substrate layer to the inner surface of the backing layer.
23. The method of claim 22 wherein the substrate layer comprises a textile material.
24. A multi-layer outer panel for a game ball manufactured in accordance with the method of claim 1.
25. A method for manufacturing a game ball, the method comprising the steps of:
providing an air-impermeable bladder having a substantially spherical shape;
providing a plurality of panels, each panel comprising:
a three-dimensional top layer comprising a first material and having an outer surface and an inner surface, the outer surface of the top layer dimensioned to substantially correspond to a section of a surface of the ball, and
at least one three-dimensional backing layer comprising a second material and having an outer surface and an inner surface, the outer surface of the at least one three-dimensional backing layer connected to the inner surface of the top layer; and
interconnecting the edges of the panels, thereby forming an outer layer of the ball surrounding the bladder.
26. The method of claim 25, further comprising adhesively mounting the plurality of panels onto the bladder.
27. The method of claim 26, further comprising interposing a reinforcing layer between the plurality of panels and the bladder.
28. The method of claim 27, wherein the reinforcing layer comprises a flexible, generally spherical skeletal frame separate from and surrounding the bladder.
29. The method of claim 25, wherein the outer layer comprises a self-supporting structure.
30. The method of claim 25, wherein the air-impermeable bladder comprises an elastic material.

31. The method of claim 30, wherein the ball is inflatable and a radius of the game ball in an inflated state exceeds a radius of curvature of each of the plurality of panels in an unloaded state.
32. A ball manufactured in accordance with the method of claim 25.